

Certification Test Plan

Report Number
07-V-ESS-035-CTP-01

Election Systems & Software
Unity 4.0 Voting System

Includes:

Audit Manager, Election Data Manager, Hardware Programming Manager, ES&S Ballot Image Manager, Ballot On Demand, iVotronic Image Manager, Model 100, Model 650, intElect DS200, iVotronic, Data Acquisition Manager, Election Reporting Manager

Also including the AutoMARK

AutoMARK Information Management System, A100 and A200 AutoMARK Voter Assist Terminal

Test Plan Rev 01
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*Accredited by the Election Assistance
Commission (EAC) for Selected Voting
System Test Methods or Services*

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TABLE OF CONTENTS

1	INTRODUCTION.....	5
1.1	SCOPE	5
1.2	APPLICABLE VOTING SYSTEM STANDARDS	6
1.3	REFERENCES	6
1.4	TERMS AND ABBREVIATIONS	7
2	PRE-CERTIFICATION TESTS.....	10
2.1	PRE-CERTIFICATION TEST ACTIVITY	10
2.1.1	<i>Physical Configuration Audit (PCA)</i>	10
2.1.2	<i>Functional Configuration Audit</i>	10
2.1.3	<i>Source Code Review</i>	10
2.1.4	<i>Trusted Build</i>	11
2.2	PRE-CERTIFICATION ASSESSMENT RESULTS.....	11
2.2.1	<i>Results</i>	11
3	MATERIALS REQUIRED FOR TESTING	12
3.1	SOFTWARE/FIRMWARE	12
3.2	EQUIPMENT (HARDWARE)	13
3.3	TEST MATERIALS	16
3.4	DELIVERABLE MATERIALS	16
3.5	PROPRIETARY DATA	16
4	TEST SPECIFICATIONS.....	17
4.1	HARDWARE CONFIGURATION AND DESIGN	17
4.2	SOFTWARE SYSTEM FUNCTIONS	17
4.2.1	<i>System Functional Testing</i>	17
4.3	TEST CASE DESIGN.....	24
4.3.1	<i>Hardware Qualitative Examination Design</i>	24
4.3.2	<i>Hardware Environmental Test Case Design</i>	25
4.3.3	<i>Software Module Test Case Design and Data</i>	25
4.3.4	<i>Software Functional Test Case Design</i>	25
4.3.5	<i>System-level Test Case Design</i>	25
4.3.6	<i>Sampling Methodology</i>	25
4.4	EAC INTERPRETATIONS	25
5	TEST DATA	26
5.1	DATA RECORDING	26
5.2	TEST DATA CRITERIA	26
5.3	TEST DATA REDUCTION	26
6	TEST PROCEDURE AND CONDITIONS	27
6.1	FACILITY REQUIREMENTS.....	27
6.2	TEST SETUP	27
6.3	TEST SEQUENCE	28
6.4	TEST OPERATIONS PROCEDURES	28
7	APPROVAL SIGNATURES.....	29

LIST OF TABLES

Table 1 - Matrix of Terms & Abbreviations provided by the vendor.	7
Table 2 - Matrix of Required Software/Firmware	12
Table 3 - Matrix of Required Hardware.....	13

Table 4 - Matrix of Test Materials 16

Table 5 - Matrix of System Functional Testing 17

Table 6 - Matrix of Other System Testing 24



1 INTRODUCTION

This Master Test Plan outlines the approach SysTest Labs will implement to perform Federal Election Commission (FEC) Voting System Standards Certification testing of the Election Systems and Software (ES&S) Unity 4.0 Voting System. The purpose of this document is to provide a clear and precise plan for test elements required to ensure effective Certification testing as outlined in section 1.2 of this Certification Test Plan.

The objective of this test plan is to outline the certification test tasks. This test plan:

- Identifies items that need to be tested;
- Defines the test approach;
- Identifies required hardware, support software, and tools to be used for testing; and
- Identifies the types of tests to be performed.

1.1 Scope

SysTest Labs Incorporated is submitting this report as a summary of the certification testing efforts for Election Systems and Software (ES&S) Unity 4.0 Voting System with AutoMARK 1.4. An overview of the certification testing effort in conjunction with the AutoMARK system will be defined throughout this document. The Voting System under test consists of the election management system: Audit Manager, Election Data Manager, AutoMARK Information Management System, ES&S Ballot Image Manager, Ballot on Demand, iVotronic Image Manager, Hardware Programming Manager, Data Acquisition Manager, Election Reporting Manager, Compact Flash Multi-Card Reader/Writer, Automatic Bar Code Reader and a hand held bar code scanner.

The Voting System also consists of an iVotronic DRE with or without a 4-inch or 9.5-inch Real-Time Audit Log printer, with stand-alone printer or the communication pack, the AutoMARK Voter Assist Terminal, a Model 100 precinct scanner with steel ballot box, an intElect DS200 precinct scanner with steel ballot box, and a Model 650 central count scanner.

This effort includes a full documentation review, source code review, hardware testing and end-to-end testing. Testing consists of the development of a test plan, managing system configurations, executing a subset of functional, system level and sample test cases based on test requirements and functionality, all functional and system level tests prepared by SysTest Labs and analysis of results.

The following attachments apply to this Certification Test Plan:

- Attachment A: Technical Data Package Documents
- Attachment B: Supported Functionality Declaration
- Attachment C: List of Source Code Reviewed - **PROPRIETARY**
- Attachment D: Hardware Test Plan
- Attachment E: Unity 4.0 Test Case Matrix
- Attachment F: Security and Telecom Test Case

1.2 Applicable Voting System Standards

SysTest Labs will provide certification testing for ES&S on the Election Systems and Software (ES&S) Unity 4.0 Voting System. The resulting certification will be to the FEC VSS 2002.

ES&S requirements

Certification Test component	Applicable Standard
FCA Doc Review	FEC VSS 2002
Testing of the Voting System	FEC VSS 2002
Source Code Review	FEC VSS 2002
Trusted Build	EAC Testing and Certification Program
Hardware	VSS 2002 and VVSG 2005
PCA Doc Review (for all documents except for Security documents)	VVSG 2005
PCA Doc Review (for all Security documents)	FEC VSS 2002

ATS requirements

Certification Test component	Applicable Standard
FCA Doc Review	FEC VSS 2002
Testing of the Voting System	FEC VSS 2002
Source Code Review	FEC VSS 2002
Trusted Build	EAC Testing and Certification Program
Hardware	VSS 2002
PCA Doc Review	FEC VSS 2002

The Functional Configuration Audit will consist of an assessment of the vendor's testing to its System Requirements Specification, as outlined in the applicable voting standard, as well as the performance of functional and system level integration tests. This includes developing a thorough test plan, managing system configurations, generating test cases as needed based on the set of test requirements (in addition to the test cases and procedures furnished by the vendor), test execution, and analysis of test results.

1.3 References

1. Federal Election Commission Voting System Standards (FEC VSS), April 2002. Volumes I and II.
2. Election Assistance Commission Voluntary Voting System Guidelines (EAC VVSG), 2005 Version 1.0. Volumes I and II.
3. NIST NVLAP Handbook 150: 2006.
4. NIST NVLAP Handbook and 150-22: 2005.

5. EAC Testing and Certification Program Manual, United States Election Assistance Commission, 2006
6. SysTest Labs Quality System Manual, Revision 1.0, prepared by SysTest Labs, dated November 3, 2006.

1.4 Terms and Abbreviations

These terms and abbreviations will be used throughout this document:

Table 1 - Matrix of Terms & Abbreviations provided by the vendor.

Term	Abbreviation	Description
Audit Manager	AM	Audit Manager is ES&S' tracking program for the Unity software suite. AM tracks user activity in AM, EDM and ESSIM.
Automatic Bar Code Reader	ABCR	The ABCR is a device that audits and recounts the printout generated by the iVotronic RTAL printer. The ABCR device interfaces with ABCR software installed on a PC to generate reports based upon the scanned barcodes from the RTAL printout.
AutoMARK Information Management System	AIMS	Software that facilitates creation of the election database, or conversion of a 3 rd party election database, for installation on the VAT.
AutoMARK Voter Assist Terminal	VAT	AutoMARK Technical Systems optical paper ballot marking device for disabled voters and alternative languages
Ballot On Demand		Election officials use Ballot on Demand to print test ballots, early voting ballots and ballots for polling places that run short of ballot stock on Election Day.
Binary Logic Input Device		Alternative accessible appliance that is connected to the AutoMARK Voter Assist Terminal through a stereo jack, enabling the voter to issue either a yes or no command. These devices may include foot pedals and Sip/Puff tubes.
Compact Flash Multi-Card Reader/Writer		The ES&S Compact Flash Multi-Card Reader/Writer reads and writes data to multiple flash cards. A multi-card reader/writer may also be called a gang burner. Use the multi-card reader before an election to transfer ballot data to compact flash cards for the iVotronic. Election coders prepare each election using Election Data Manager, and then prepare compact flash cards and PEBs (personalized electronic ballots) using Hardware Programming Manager. Use the multi-card reader to quickly create additional compact flash cards for iVotronic terminals. The other use for the Compact Flash Multi-Card Reader/Writer is to read in audit data from the iVotronic.
Data Acquisition Manager	DAM	The ES&S Data Acquisition Manager software is used to transmit election results over a network connection from ES&S ballot counting equipment to a central count location.
Delkin USB		A USB flash drive to store the scanner's election definition, audit log and other election-specific information.
Election Data Manager	EDM	Election Data Manager is a database system that stores all of a jurisdiction's precinct, office, and candidate information. It is used in conjunction with other Unity software to format and print ballots, program ballot scanning equipment, and produce Election Day reports.
Election Reporting Manager	ERM	The Election Reporting Manager is an election results reporting program, used to generate paper and electronic reports for poll workers, candidates, and the media. ERM can display updated election totals on a

Term	Abbreviation	Description
		monitor as ballot data is tabulated and can send result reports directly to media outlets over the Internet. ERM is designed to support a wide range of ES&S ballot scanning equipment and can produce reports for both central count systems and precinct count systems.
ES&S Ballot Image Manager	ESSIM	ES&S Ballot Image Manager is a publishing tool used to design and print ballots with the election information stored in EDM.
Flash Memory Card	FMC	The FMC supplies ballot content information to the VAT.
iVotronic		The iVotronic is a DRE (direct recording electronic) touch screen that displays ballots and records votes. The iVotronic addresses accessibility requirements through the use of voice files, font type and size, and color combinations. There are two sizes of iVotronics. One is the 12 inch with 3 key ADA buttons the other is a 15 inch that have a 3, 4 or 6 key ADA buttons. There are also non-ADA iVotronics. The iVotronic 6 key allows the use of the sip and puff.
iVotronic Cut and Drop Printer		
iVotronic Image Manager	iVIM	The iVotronic Image Manager enables the user to create and format graphic ballot screens for the iVotronic voting device.
Hardware Programming Manager	HPM	Hardware Programming Manager enables the user to import, format, and convert the election definition files for ballot scanning equipment and DREs.
intElect DS200	DS200	The intElect DS200 precinct ballot scanner is part of a jurisdiction-wide election tabulating system. Voters make selections and then insert their ballots directly into the Model 100 at the polling place. The scanner tabulates votes and sorts a ballot as soon as a voter inserts it and then feeds the ballot into the attached ballot storage bin accepting ballots inserted in any direction and reads both sides of the ballot simultaneously.
Model 100	M100	The Model 100 precinct ballot scanner is part of a jurisdiction-wide election tabulating system. Voters make selections and then insert their ballots directly into the Model 100 at the polling place. The scanner tabulates votes and sorts a ballot as soon as a voter inserts it and then feeds the ballot into the attached ballot storage bin accepting ballots inserted in any direction and reads both sides of the ballot simultaneously.
Model 650	M650	The Model 650 is an optical scan central count counter that is used to scan ballots at a central count location. The M650 scan up to 350 ballots per minute, counts different sizes (11, 14,17, 19) of ballots and can read voting marks on the right or left of the ballot column. The M650 prints results reports and saves results to a zip disk.
PCMCIA		PCMCIA card contains the M100 election definition that exactly mirrors the ballot contents and issues as defined by election officials.
Personalized Electronic Ballots	PEB	An electronic ballot that a jurisdiction defines for use with the iVotronic to open polls, load ballots and collect votes from each terminal at the end of an election day.
Real-Time Audit Log Printer	RTAL	The Real-Time Audit Log Printer records each voter's actions on a paper audit log in real time, including all selections and de-selections. The paper audit log can be viewed but not touched by the voter as the paper is behind a clear plastic cover. Prior to casting a vote. Under-voted contests and a two-dimension bar code of the votes are appended to the audit entries and the paper advances out of the view window in either a 9-inch

Term	Abbrevi- ation	Description
		or 4.5-inch window.
Unity Release	N/A	The system configuration(s) of ES&S hardware and software voting system(s).

2 PRE-CERTIFICATION TESTS

2.1 Pre-Certification Test Activity

2.1.1 Physical Configuration Audit (PCA)

SysTest Labs conducts a PCA of the documents submitted for review in the ES&S Technical Data Package, including Functional Requirements, Specifications, Procedures, System Overview, Configuration Management Plan, and Quality Assurance Program. The review is based on the standard noted in section 1.2 of this test plan for each of the submitted individual components of the voting system subject to this Certification Test Plan. For any FEC VSS 2002 requirements that are more demanding than the EAC VVSG 2005, SysTest Labs reviewed the ES&S documents to those 2002 requirements.

2.1.2 Functional Configuration Audit

SysTest Labs conducts an **FCA** review of the vendor test cases delivered as part of the Technical Data Package. The review was conducted against the standard as defined in section 1.2 of this test plan, for each of the submitted components. Any requirements that were identified as not being tested, or insufficiently tested, have been included in the Test Cases that SysTest Labs will execute.

The results of these audit reviews, as well as the discrepancies generated, will be included in the Certification Report.

2.1.3 Source Code Review

The voting system is subject to a full certification and thus all code is subject to a full review against the standard noted in section 1.2 of this test plan. SysTest Labs has conducted a source code review of all the code submitted by the vendor for the voting system under test. The source code submitted by the vendor and subject to review as part of this Certification Test is in the following languages: C, C++, JAVA, VB, Assembler, & Cobol.

Source Code Review Tools utilized by SysTest Labs include

- Practiline Line Counter: a commercial application used to determine the counts of executable and comment lines;
- Module Finder: a SysTest Labs proprietary application used to parse module names from C/C++ and VB code and populate the identified module names into the review documents;
- ExamDiff Pro: a commercial application used to compare revised code to previously reviewed code; and
- KEdit: a commercial text editor application running a SysTest Labs proprietary macro used to parse module names from Cobol code and populate the identified module names into the review document.

SysTest Labs utilizes a team approach in reviewing and managing the tasks of receiving the code to be reviewed, determining the volume of code to be reviewed, reviewing the vendor's internal coding standards and determining if there are any variances from the prescribed Standards, creating the review work documents, distributing the code to be reviewed along with the created work documents to the project code reviewers, reviewing the code, performing peer reviews, creating discrepancy reports, and receiving modified code and other vendor responses.

2.1.4 Trusted Build

Prior to testing, SysTest Labs will conduct a trusted build according to the detailed trusted build procedure provided by the vendor in the TDP and the EAC Testing and Certification Program Manual. The process includes interviews of key vendor staff to evaluate vendor processes and process conformance in the areas of configuration management and quality assurance. Preparation for the trusted build includes obtaining and reviewing the vendor-defined procedure for constructing the build platform, verifying the target build platform, and acquiring the necessary materials. Execution of the trusted build complies with the vendor's detailed build procedure and additional steps required in the Certification Program Manual resulting in installation media containing the installation files. Finally, the conclusion of the trusted build consists of record-keeping and archiving procedures that occur at SysTest Labs, and the resulting media is submitted to the EAC-approved software repository as part of finalizing the Certification Test Report.

2.2 Pre-Certification Assessment Results

SysTest Labs conducts a pre-certification test assessment as noted in Section 2.1 of this Certification Test Plan. This assessment includes the review of the Technical Data Package (Documentation and Vendor Testing) and the complete source code set or changes to previously reviewed source code submitted by the vendor for each component of the Voting System under test.

2.2.1 Results

Based on the findings of the pre-certification assessment for the voting system defined in this test plan, SysTest Labs has determined that vendor's Test Plan, Procedures, and Scripts are consistent with the FEC Voting System Standards for TDP documentation. Issues were noted in a discrepancy report that was provided to ES&S for resolution prior to completion of testing.

Full assessment, review, and correction of the vendor's TDP will be completed as part of the execution of this Certification Test Plan. Also to be executed as part of this Certification Test Plan are the required Readiness Test, a sampling of the vendor's test cases based on the supported functionality for this certification, the SysTest Labs test cases, and a system accuracy test.

3 MATERIALS REQUIRED FOR TESTING

3.1 Software/Firmware

Items identified in the table reflect all software and firmware used to perform hardware, software, telecommunications, security and integrated system tests. Not all items listed below are required to run the Unity 4.0 voting system. However, all items listed were part of the certification test effort.

Table 2 - Matrix of Required Software/Firmware

Manufacturer	Application(s)	Version	Test Type
ES&S	Audit Manager	7.5.0.0	Pre-Voting
ES&S	Election Data Manager	7.8.0.0	Pre-Voting
ES&S	ES&S Ballot Image Manager	7.7.0.0	Pre-Voting
ES&S	iVotronic Image Manager	3.1.0.0	Pre-Voting
ES&S	Hardware Programming Manager	5.6.2.0	Pre-Voting
ES&S	Data Acquisition Manager	6.1.1.0	Post-Voting
ES&S	Election Reporting Manager	7.4.0.0	Post-Voting
ATS	AIMS	1.4	Pre-Voting
Manufacturer	COTS Application(s)	Version	Application
Required COTS software for the Unity 4.0 voting system			
Microsoft Corporation	Windows XP Professional	2002 SP2	All software application
RM/COBOL	RM COBOL RUNTIME System	11.01	ERM & HPM
Adobe	Adobe Type Manger	4.1	ESSIM
CSM GmbH	OmniDrive USB Professional		HPM & ERM
Microsoft Corporation	Excel		
Non required COTS software for the Unity 4.0 voting system			
Broadcom	Broadcom Gigabit Integrated Controller	9.02.06	Hand scanner
SigmaTel	C-Major Audio	42.xx	Hand scanner
	Conexant D110 MDC	92 Modem	Hand scanner
Intel	Graphics Media Accelerator Driver for Mobile		Hand scanner
Microsoft Corporation	MS Professional Edition 2003	11.0.7969.0	Hand scanner
O2Micro	O2Micro Smartcard Driver	2.26.0000	Hand scanner
ATI	ATI Display Driver		Server
Dell	Dell OpenManage Array Manager		Server
Microsoft Corporation	DirectX Hotfix – KB839643 HP Laser Jet 2300 Uninstaller Intel® PRO Intelligent Installer,	2.01.1000	Server
Intel	Intel® PRO Network Adapters and Drivers		Server
Microsoft Corporation	Internet Explorer Q867801		Server
Symantec Corporation	LiveUpdate	1.7	Server
Symantec Corporation	Symantec AntiVirus Client	8.0.0.374	Server
Microsoft Corporation	Outlook Express Q823353		Server
Microsoft Corporation	Windows 2000	Service Pack 4	Server
Microsoft Corporation	Windows 2000 Administration Tools	5.0.0.0000	Server
Microsoft Corporation	Microsoft Health Monitor 2.1	2.10.1850.0000	Server

Manufacturer	Application(s)	Version	Test Type
Microsoft Corporation	Microsoft Internet Security and Acceleration Server	3.0.1200	Server
Microsoft Corporation	Microsoft Shared Fax	1.0000	Server
Microsoft Corporation	Microsoft Small Business	Server 2000	Server
Microsoft Corporation	Microsoft Data Access Components KB870669		Server
Microsoft Corporation	Microsoft.NET Framework	1.1.4322	Server
Microsoft Corporation	Windows 2000 Hotfix - KB819696, - KB820888, - KB822831, - KB823182, - KB823559, - KB82410, - KB824141, - KB824146, - KB825119, - KB826232, - KB828028, - KB828035, - KB828741, - KB828749, - KB835732, - KB837001 - KB839643, - KB839645, - KB840315, - KB841872, - KB841873, - KB842526,	Windows 2000 Hotfix - 20030703.183130 - 20030604.152521 - 20030611.114034 - 20030618.121409 - 20030627.135515 - 20030716.151320 - 20030805.151423 - 20030823.144456 - 20030827.151123 - 20031007.160553 - 20040122.114409 - 20031023.142138 - 20040311.130332 - 20031023.124056 - 20040323.171849 - - 20040506.120130 - 0040519.160457 - 20040622.153749 - 20040520.90850 - 20040610.95344 - 20040521.202909	Server

3.2 Equipment (Hardware)

Equipment identified in the table reflects all hardware used to perform hardware, software, security and integrated system tests. Not all items listed below are required to run the Unity 4.0 voting system. However, all items listed were part of this certification test effort.

Table 3 - Matrix of Required Hardware

Item	Manufacturer	SN	Version/Rev	Type
intElect DS200 (Scanner)	ES&S	ES0107370002 ES0107370025 ES0107360007	Hardware 1.2 DS200 Firmware 1.2.0.0 Power Management Firmware 1.0.0.0 Scanner Firmware 2.7.0.0.0	Voting
DS200 Ballot Box (Steel ballot box w/ diverter)	ES&S	1573	N/A	
Model 100 (Scanner)	ES&S	015483 202975 206271 205071	Hardware v. 1.3.0 Firmware v. 5.4.0.0	Voting
M100 Ballot Box (Steel ballot box w/ diverter)	ES&S	C4243	N/A	
Model 650 – Red – left (Scanner)	ES&S	7003	Hardware v. 1.2 Firmware v. 2.2.1.0	Voting
Model 650 – Green – Right	ES&S	2406	Hardware v. 1.1	Voting

Item	Manufacturer	SN	Version/Rev	Type
(Scanner)			Firmware v. 2.2.1.0	
Model 650 – Green – Left (Scanner)	ES&S	1102	Hardware v. 1.2 Firmware v. 2.2.1.0	Voting
iVotronic 12inch – 3 key (DRE)	ES&S	V0118281-< V0109021-C	Hardware v. 1.1 Firmware v. 9.2.0.0	Voting
iVotronic 12inch - Non-ADA (DRE)	ES&S	V0117997-< V0116171-C	Hardware v. 1.1 Firmware v. 9.2.0.0	Voting
iVotronic 15inch – 3 key (DRE)	ES&S	V5120469-<	Hardware v. 1.1 Firmware v. 9.2.0.0	Voting
iVotronic 15inch – 4 key (DRE)	ES&S	V5149150-<	Hardware v. 1.1 Firmware v. 9.2.0.0	Voting
iVotronic 15inch – 6 key (DRE)	ES&S	V5178132-< V5178543-<	Hardware v. 1.1 Firmware v. 9.2.0.0	Voting
iVotronic 15inch - Non-ADA (DRE)	ES&S	V5118248-< V5105369-C	Hardware v. 1.1 Firmware v. 9.2.0.0	Voting
iVotronic 15inch Supervisor (RED)	ES&S	S5177852-< S5103690-C	Hardware v. 1.1 Firmware v. 9.2.0.0	
iVotronic RTAL Booth 4.5 inch window	Pivot and Xten	00652006031537 21	Hardware v. N/A Firmware v. V012	Voting
iVotronic RTAL Booth 9 inch window	Pivot and Xten	00652005111717 84	Hardware v. N/A Firmware v. V012	Voting
ABCR (Automatic Bar Code Reader)	JADAK	070829-009	Hardware v. N/A	Post Voting
Communication Pack with Seiko printer	Pivot Seiko	CP04001103 2016716C	Hardware v. 1.1	Voting
Printer (standalone for iVotronic)	Seiko	2003344A	N/A	Voting
BOD Printer	OkiData	AF54009576AO		Pre Voting
Printer (M650 Red Left Printer)	520 OkiData	407D4010894 407D4010960	N/A	Pre Voting
Printer (M650 Green Right Printer)	520 OkiData	407D4011099 204A2005641	N/A	Pre Voting
Printer (M650 Green Left Printer)	Epson Model # LQ-590	FSQY094255 FSQY093447	N/A	Pre Voting
Multi-Modem Adapters Options (Used in DAM PC)	Equinox		N/A	4 and 8 port Post Voting
Multi-Modem Adapters Options (Used in DAM PC)	Digi		N/A	4 and 8 Port Post Voting
Multi-Modem Adapters Options (Used in DAM PC)	Perle		N/A	4 and 8 Port Post Voting
Multi-Port Adapter Options (Used in DAM PC)	SeaLevel		N/A	7801 & 7803 – 8 Port 7406 – 4 Port
USB PEB Reader/Writer	Pivot	UPP02000231	Hardware v. 1.1	Pre and Post Voting
Hand Bar Code Reader	Voyager	3505140549	N/A	Post Voting
Omni Drive Professional USB	CSM GmbH	23728-USB	N/A	
Omni Drive Professional USB2	CSM GmbH	790-USB2	N/A	
SanDisk Reader	SanDisk		N/A	
Zip Disk	Iomega	1GBS2250K7	N/A	
Multi Compact Flash Reader/Writer (iVo)	ES&S	0001	Hardware v. N/A iVotronic Compact Flash Get	Pre and Post Voting

Item	Manufacturer	SN	Version/Rev	Type
			Audit Data Software v. 9.2.0.0 CF Duplicator Software v. 9.2.0.0	
Volume Control (iVotronic 3-key volume button)	ES&S	N/A	Hardware v. N/A	Voting
Serial PEB Reader	Pivot	PP01030024	Hardware v.1.1	
UPS	Belkin	N/A	N/A	
Sip n Puff	Pivot	N/A		Voting
Pollbook	Pivot	N/A		
iVotronic booth	Pivot	N/A	N/A	
iVotronic booth cut and drop booth/printer	Future logic – Printer Pivot -Booth		Hardware v.N/A Software v.V012	
Latitude (laptop)	Dell	SN: 00030480, 00045-506-612-651	Windows XP Professional, SP2	Pre Voting
Intel® Pentium® M processor 1.60GHz 1.60 GHz, 1.00 GB of RAM (Laptop for Remote modeming only)	Dell	CN-0T9369-48643-525-0082 REV A00	Windows XP Professional, SP2	Post Voting (DAM Remote only)
Pentium® 4 CPU 2.00GHz, 512MB of RAM (PC System 1)	Dell	Monitor SN: CN-09M556-64180-289-0137 Tower SN: GN8JF21	Windows XP Professional, SP2	Pre and Post (Omni USB)
Pentium® 4 CPU 2.80GHz, 2.79 GHz, 1.00 GB of RAM (PC System 2)	Dell	Monitor SN: CN-09M556-64180-2BC-0A45 Tower SN: 7B0WL21	Windows XP, SP2	Pre and Post Voting (Omni USB2)
Dell PC Pentium® 4 CPU 2.80 GHz 2.79 GHz, 512 MB of RAM (PC System 3)	Dell	Monitor SN: CN-09M556-64180-2AJ-0BB0 Tower SN: 7D0WL21	Windows XP Professional, SP2	Post Voting (DAM Host only)
Server (PC) PE600SC Intel Pentium 4 CPU 1.80 GHz AT/AT compatible 523,763 KB RAM	Dell	Monitor SN: CN-09M556-64180-2B8-04KR REV 00 Tower SN: 3JY1F21		
Intel® Pentium® M processor 1.73GHz 795MHz, 0.99GB of RAM, (Physical Address Extension - laptop)	Dell	SN: CN-0U80824864361 55779 REV A06	Windows XP Professional, SP2	RTAL Hand scanner and ABCR
Pentium 4 PCU 2.80GHz, 2.79 GHz, 512 MB of RAM	Dell	38843-01U-8590 Monitor SN:MX-04D025-47605-1B8-DSH1 REV	Windows XP Professional, SP2	Pre &Post voting (Compact Flash Multi-Card Reader/Writer)

Item	Manufacturer	SN	Version/Rev	Type
		A00		
ATS Laptop				
VAT Model # A100 (Phase I)	ATS		Hardware v 1.0 Firmware v. 1.4	Voting
VAT Model # A200 (Phase II)	ATS		Hardware v 1.0 Firmware v. 1.4	Voting

3.3 Test Materials

Items identified in the table reflect all test materials required to perform hardware, software, security and integrated system tests not identified in section 3.1 or 3.2 above. The items noted in this section are primarily consumables required for the testing effort. Some of these may be reused for other testing after being properly prepared, for example, various forms of flash memory such as USB or compact flash memory devices that have been erased and/or formatted prior to each use.

Table 4 - Matrix of Test Materials

Item	Details
Printer paper rolls	RTAL, Communication Pack, M100, DS200 and Seiko Printer
Zip disks	M650 program media
USB SanDisk (CF)	Compact Flash card 128, 256 & 512MB
Blank paper ballot stock	Inches/ballot positions: 11x36, 14x36, 14x48, 17x45, 17x60, 19x51, 19x68
PEB	Supervisor and Voter iVotronic media
PCMCIA	PC Cards M100 program media
USB Memory Stick	DS200
Head sets	For the VAT and iVotronic

3.4 Deliverable Materials

Deliverable Materials consist of all of the documents submitted as part of the TDP supplied by the vendor.

In addition to the hardware and software identified in sections 3.1, 3.2, and 3.3, the vendor provides the Technical Data Package for the voting system subject to this Certification Test Plan.

Please see Attachment A for a complete list of TDP documents.

3.5 Proprietary Data

SysTest Labs will indicate which portions of reports are considered proprietary information. We understand material that is not classified as proprietary, including test plans and test reports, will become publicly available. Proprietary information will be submitted in a separate attachment to the EAC, and marked "Proprietary" in the file name.

4 TEST SPECIFICATIONS

4.1 Hardware Configuration and Design

The Hardware Configuration Audit compares the hardware to the documentation supplied by the vendor, ensuring the configuration submitted for testing as defined by the test plan matches that which is actually tested. In order to conduct system level integration tests, SysTest Labs may need to include minimal repeats of the operational tests to confirm there are no changes to systemic responses.

4.2 Software System Functions

The scope of testing for the software certification and system-level tests as defined in section 1.2 of this plan includes:

- Pre-Certification Test Assessment reflecting the Technical Data Package document examination portions of the Physical Configuration Audit and the Functional Configuration Audit
- Physical Configuration Audit:
 - Establishment of the software/hardware configuration baseline used in testing
 - Full Source Code Review
 - Review of Vendor's functional specification for adequacy or discrepancy
 - Execution of the Trusted Build and comparison to the code tested
- Functional Configuration Audit
 - Creation and issuance of a Certification Test Plan
 - Review, evaluation, creation, and execution of Functional Tests
 - Performance of System Level Integration Tests

4.2.1 System Functional Testing

Review of Vendor's functional specification, test plans, test cases, and test results demonstrates the following functional areas are included in the voting system's overall capabilities, pre-voting, voting, and post-voting functions. This functionality will be verified by the tests performed as noted in this section of the test plan. System functional tests are performed for the purpose of assessing the response of the software to a range of conditions.

Table 5 - Matrix of System Functional Testing

Function	Test Methodology
Ballot Preparation Functions	
a. Ballot preparation subsystem	Verify the election is defined for election day, and one more precinct/polling place can be defined.
Before, During & After Processing of Ballots	
b.1. Logic Test – Interpretation of Ballot Styles & recognition of precincts	Verify in Functional Tests: Verify voting variation functionality identified by ES&S for the ES&S Unity 4.0 Voting System (Vol. 1. Section 2.2.8.2).
b.2. Accuracy Tests- Ballot reading accuracy	No accuracy test required.
b.3. Status Tests- Equipment statement & memory contents	Verify in Functional Tests: Equipment statement & memory contents at the corresponding intervals outlined in user documentation for the functions a. b.4, c 1-7 and d. 1-8
b.4. Report Generation – Produce test output data	Verify in Functional Tests:

Function	Test Methodology
	Clearing Election Totals Manual data entry Generating a Zero Report Testing an Election Creating Test Reports Clearing Totals for Election Day Selecting Reporting Groups Loading Scanner Totals Producing Election Reports Displaying Election Information ERM Election Results
<i>b 5. Report Generation- Produce audit data</i>	Verify in Functional Tests: System audit reports voting
Polling Place Functions	
<i>c.1. Opening the polls, accepting & counting ballots</i>	Verify in Functional Tests: Zero Reports Scan paper ballots Alerts for over votes and under votes
<i>c.2. Monitoring equipment status</i>	Verify in Functional Tests: Equipment status as identified in user documentation
<i>c.3. Equipment response to commands</i>	Verify in Functional Tests: Equipment response to all voter and poll worker commands as identified in user documentation
<i>c.4. Generating real-time audit messages</i>	Verify Verified in Functional Tests: Print audit log Each audit message contains a timestamp. Election name, software, and firmware are listed at the beginning of each audit log. Count of ballots processed is included in log of uploaded results. Error messages. Precinct ID is identified for all results pertaining to insertions, additions, and deletions.
<i>c.5: Closing polls and disabling ballot acceptance</i>	Verify in Functional Tests: Inability to cast additional ballots Close of polls Inability to scan additional ballots
<i>c.6. Generating election data reports.</i>	Verify in Functional Tests: Generation of precinct reports
<i>c.7. Transfer ballot count to central counting location</i>	Verify in Functional Tests: Reading the USB from the ERM Telecommunication
Central Count Functions	
<i>d.1.Process ballot deck for > 2 precincts with 3 split precincts per precinct for a total of 6 ballot styles</i>	Verify in Functional Tests: Process of ballot decks on the
<i>d.2. Monitoring equipment status</i>	Verify in Functional Tests: Equipment status as identified in user documentation
<i>d.3. Equipment response to commands</i>	Verify in Functional Tests: Equipment responds to all voter and poll worker commands as identified in user documentation (Messages generated by the equipment that require an action by the voter or poll worker before operation continues--as in blank ballots, overvotes, undervotes as defined in election setup)

Function	Test Methodology
d.4. Integration with peripherals equipment or other data processing systems	See b.3
d.5. Generating real-time audit messages.	See b.4
d.6. Generating precinct-level election data reports	See b.3
d.7. Generating summary election data reports	See b.3
d.8. Transfer of detachable memory module to the processing equipment	See b.3

SysTest Labs' system level and functional test cases are listed below. Also, see Attachment E Unity 4.0 Test Cases Matrix for an outline of functionality being tested in each test case.

System Level Test Cases
<div>GEN 01 Test Case</div> <ul style="list-style-type: none"> - Define election contests, candidates, issues etc. (V1:2.2.6) - Maintain accurate and complete audit records (V1:2.2.5.2.1) - Maintain accurate and complete error and status messages (v1:2.2.5.2.2, 2.2.5.2.3) - Accurately record cast ballots, including provisional (V1:2.4.3) - DRE shall record and retain redundant copies of the original ballot image (V1:2.2.2.2) - Ensure undervotes are counted as cast votes - Separate accumulation of Undervotes and Paper Overvotes - Ensure Overvotes are counted on paper - Maintain integrity of Vote and Audit data - Party affiliation is identified on the ballot - Accurate Definition, Count, Reporting for Election Day, Absentee - paper and DRE, with the results tallied, excluding and including provisional ballots (V1:2.2.2.1) - Write-in voting: Voting position identified for write-ins - Correctly tabulate (V1:2.2.8.1) - Have a Ballot Counter (V1:2.2.9) - Provisional/Challenged ballots - Supported on the iVotronic ballots at Central Count - Overvotes - Undervotes - Blank ballots - 2 Precincts - Split Precincts (3 splits per precinct) - All paper-based systems shall: Protect the secrecy of the vote throughout the process. (V1: 2.4.3.2.1) - Rotation = Standard (Rotates with every new Precinct) - Non-Partisan contest: Vote for 1 of N - Non-Partisan contest: "Vote for 1" race with a single candidate and a write-in - Non-Partisan contest: "Vote for 1" race with no declared candidates and write-ins - Non-Partisan contest: Multi-member board (N of M) - Non-Partisan contest: Proposition/Question - Partisan contest: Vote for 1 of N - Partisan contest: "Vote for 1" race with a single candidate and a write-in - Partisan contest: "Vote for 1" race with no declared candidates and write-ins - Partisan contest: Multi-member board (N of M) - Partisan contest, one party has no candidates - Slate & Group voting: one selection votes the slate - Recall Type A - Simple Yes/No question - Recall Type B - Retain is first option, followed by Replacement options for second or more <div>Gen02 Straight Party Test Case</div> <ul style="list-style-type: none"> - Define election contests, candidates, issues etc. (V1:2.2.6)

- Maintain accurate and complete audit records (V1:2.2.5.2.1)
- Maintain accurate and complete error and status messages (v1:2.2.5.2.2, 2.2.5.2.3)
- Accurately record cast ballots, (V1:2.4.3)
- DRE shall record and retain redundant copies of the original ballot image (V1:2.2.2.2)
- Ensure undervotes are counted as cast votes
- Separate accumulation of Undervotes and Paper Overvotes
- Ensure Overvotes are counted on paper
- Maintain integrity of Vote and Audit data
- Party affiliation is identified on the ballot
- Accurate Definition, Count, Reporting for Election Day, Absentee - paper and DRE, with the results tallied, excluding and including provisional ballots (V1:2.2.2.1)
- Write-in voting: Voting position identified for write-ins
- Using the iVotronic AutoRecovery procedure v.9.2.0.0, vote an election and recover the results from the SanDisk and not the PEB.
- Correctly tabulate (V1:2.2.8.1)
- Have a Ballot Counter (V1:2.2.9)
- Overvotes
- Undervotes
- Blank ballots
- This is a one page ballot election per voter
- 7 precincts and no split precincts
- Straight party (multi-member board)
- All paper-based systems shall: Protect the secrecy of the vote throughout the process. (V1: 2.4.3.2.1)
- Non-Partisan contest: Vote for 1 of N
- Non-Partisan contest: "Vote for 1" race with a single candidate and a write-in
- Non-Partisan contest: "Vote for 1" race with no declared candidates and write-ins
- Non-Partisan contest: Multi-member board (N of M)
- Non-Partisan contest: Proposition/Question
- Partisan contest: Vote for 1 of N
- Partisan contest: "Vote for 1" race with a single candidate and a write-in
- Partisan contest: "Vote for 1" race with no declared candidates and write-ins
- Partisan contest: Multi-member board (N of M)
- Partisan contest, one party has no candidates
- Slate & Group voting: one selection votes the slate
- Recall Type A - Simple Yes/No question
- Recall Type B - Retain is first option, followed by Replacement options for second or more
- Recall Type C - Condition contest

GEN02 PA Straight Party Test Case

- Define election contests, candidates, issues etc. (V1:2.2.6)
- Maintain accurate and complete audit records (V1:2.2.5.2.1)
- Maintain accurate and complete error and status messages (v1:2.2.5.2.2, 2.2.5.2.3)
- Accurately record cast ballots, (V1:2.4.3)
- DRE shall record and retain redundant copies of the original ballot image (V1:2.2.2.2)
- Ensure undervotes are counted as cast votes
- Separate accumulation of Undervotes and Paper Overvotes
- Ensure Overvotes are counted on paper
- Maintain integrity of Vote and Audit data
- Party affiliation is identified on the ballot
- Accurate Definition, Count, Reporting for Election Day, Absentee - paper and DRE, with the results tallied, excluding and including provisional ballots (V1:2.2.2.1)
- Write-in voting: Voting position identified for write-ins
- Correctly tabulate (V1:2.2.8.1)
- Have a Ballot Counter (V1:2.2.9)
- Overvotes

- Undervotes
- Blank ballots (Not applicable on the iVotronic)
- This is a two page ballot election per voter
- 7 precincts
- Straight party (multi-member board)
- All paper-based systems shall: Protect the secrecy of the vote throughout the process. (V1: 2.4.3.2.1)
- Non-Partisan contest: Vote for 1 of N
- Non-Partisan contest: "Vote for 1" race with a single candidate and a write-in
- Non-Partisan contest: "Vote for 1" race with no declared candidates and write-ins
- Non-Partisan contest: Multi-member board (N of M)
- Non-Partisan contest: Proposition/Question
- Partisan contest: Vote for 1 of N
- Partisan contest: "Vote for 1" race with a single candidate and a write-in
- Partisan contest: "Vote for 1" race with no declared candidates and write-ins
- Partisan contest: Multi-member board (N of M) and cross-endorsed candidate
- Partisan contest, one party has no candidates
- Slate & Group voting: one selection votes the slate
- Recall Type A - Simple Yes/No question
- Recall Type B - Retain is first option, followed by Replacement options for second or more
- Recall Type C - Condition contest
- Rotation = iVotronic Auto Rotate (iVo rotates with each new voter)

PRI-01 00 Open Primary Test Case

- Define election contests, candidates, issues etc. (V1:2.2.6)
- Maintain accurate and complete audit records (V1:2.2.5.2.1)
- Maintain accurate and complete error and status messages (v1:2.2.5.2.2, 2.2.5.2.3)
- Accurately record cast ballots, (V1:2.4.3)
- DRE shall record and retain redundant copies of the original ballot image (V1:2.2.2.2)
- Ensure undervotes are counted as cast votes
- Separate accumulation of Undervotes and Paper Overvotes
- Ensure Overvotes are counted on paper
- Maintain integrity of Vote and Audit data
- Party affiliation is identified on the ballots where appropriate
- Accurate Definition, Count, Reporting for Election Day, Absentee - paper and DRE, with the results tallied. (V1:2.2.2.1)
- Write-in voting: Voting position identified for write-ins.
- Correctly tabulate (V1:2.2.8.1)
- Have a Ballot Counter (V1:2.2.9)
- Overvotes
- Undervotes
- Blank ballots
- Non-Partisan contest: Vote for 1 of N
- Non-Partisan contest: "Vote for 1" race with a single candidate and a write-in
- Non-Partisan contest: "Vote for 1" race with no declared candidates and write-ins
- Non-Partisan contest: Multi-member board (N of M)
- Partisan contest: Vote for 1 of N
- Partisan contest: "Vote for 1" race with no declared candidates and write-ins
- Partisan contest: Multi-member board (N of M)
- Primary Presidential Nominations: List only the nominees, not the delegates.
- All paper-based systems shall: Protect the secrecy of the vote throughout the process. (V1: 2.4.3.2.1)
- 5 Precincts
- Rotation = Districts by Registered Voters (Non-Partisan) (Rotates based on the precincts registered voters)

PRI-01 00 Pick-a-Party Test Case

- Define election contests, candidates, issues etc. (V1:2.2.6)
- Maintain accurate and complete audit records (V1:2.2.5.2.1)

- Maintain accurate and complete error and status messages (v1:2.2.5.2.2, 2.2.5.2.3)
- Accurately record cast ballots, (V1:2.4.3)
- DRE shall record and retain redundant copies of the original ballot image (V1:2.2.2.2)
- Ensure undervotes are counted as cast votes
- Separate accumulation of Undervotes and Paper Overvotes
- Ensure Overvotes are counted on paper
- Maintain integrity of Vote and Audit data
- Party affiliation is identified on the ballots where appropriate
- Accurate Definition, Count, Reporting for Election Day, Absentee - paper and DRE, with the results tallied. (V1:2.2.2.1)
- Write-in voting: Voting position identified for write-ins.
- Correctly tabulate (V1:2.2.8.1)
- Have a Ballot Counter (V1:2.2.9)
- Overvotes
- Undervotes
- Blank ballots
- Non-Partisan contest: Vote for 1 of N
- Non-Partisan contest: "Vote for 1" race with a single candidate and a write-in
- Non-Partisan contest: "Vote for 1" race with no declared candidates and write-ins
- Non-Partisan contest: Multi-member board (N of M)
- Partisan contest: Vote for 1 of N
- Partisan contest: "Vote for 1" race with no declared candidates and write-ins
- Partisan contest: Multi-member board (N of M)
- Primary Presidential Nominations: List only the nominees, not the delegates.
- All paper-based systems shall: Protect the secrecy of the vote throughout the process. (V1: 2.4.3.2.1)
- 5 precincts
- Rotation = Standard (Candidate < Vote for)

PRI-02 00 (Closed Primary) Test Case

- Define election contests, candidates, issues etc. (V1:2.2.6)
- Maintain accurate and complete audit records (V1:2.2.5.2.1)
- Maintain accurate and complete error and status messages (v1:2.2.5.2.2, 2.2.5.2.3)
- Accurately record cast ballots, (V1:2.4.3)
- DRE shall record and retain redundant copies of the original ballot image (V1:2.2.2.2)
- Ensure undervotes are counted as cast votes
- Separate accumulation of Undervotes and Paper Overvotes
- Ensure Overvotes are counted on paper
- Maintain integrity of Vote and Audit data
- Party affiliation is identified on the ballots where appropriate
- Accurate Definition, Count, Reporting for Election Day, Absentee - paper and DRE, with the results tallied. (V1:2.2.2.1)
- Write-in voting: Voting position identified for write-ins.
- Correctly tabulate (V1:2.2.8.1)
- Have a Ballot Counter (V1:2.2.9)
- Overvotes
- Undervotes
- Blank ballots
- Non-Partisan contest: Vote for 1 of N
- Partisan contest: Vote for 1 of N
- Partisan contest: Multi-member board (N of M)
- Partisan contest, one party has no candidates
- Primary Presidential Delegates: a delegate slate, display of delegates with nominees
- Recall Type D
- 7 Precincts
- All paper-based systems shall: Protect the secrecy of the vote throughout the process. (V1: 2.4.3.2.1)
- Query Undervote enabled on Precinct Paper Tabulators (100/200)

- Rotation = District by Registered Voters (Rotates based on party's registered voters by Party)

Gen03 Test Case

- Define election contests, candidates, issues etc. (V1:2.2.6)
- Maintain accurate and complete audit records (V1:2.2.5.2.1)
- Maintain accurate and complete error and status messages (v1:2.2.5.2.2, 2.2.5.2.3)
- Accurately record cast ballots, including provisional (V1:2.4.3)
- DRE shall record and retain redundant copies of the original ballot image (V1:2.2.2.2)
- Ensure undervotes are counted as cast votes
- Separate accumulation of Undervotes and Paper Overvotes
- Ensure Overvotes are counted on paper
- Maintain integrity of Vote and Audit data
- Party affiliation is identified on the ballot
- Accurate Definition, Count, Reporting for Election Day, Absentee - paper and DRE, with the results tallied, excluding and including provisional ballots (V1:2.2.2.1)
- Write-in voting: Voting position identified for write-ins
- Correctly tabulate (V1:2.2.8.1)
- Have a Ballot Counter (V1:2.2.9)
- Provisional/Challenged ballots -
- Overvotes
- Undervotes
- Blank ballots
- Non-Partisan contest: Vote for 1 of N
- Partisan contest: Multi-member board (N of M)
- Partisan contest, one party has no candidates
- Non-Partisan contest: Proposition/Question
- Slate & Group voting: one selection votes the slate
- Multi-language ballots
- Audio elections, 3 Key, 4 Key, 6 Key with and w/o sip and puff iVotronics, audio button,
- 1 Precinct
- All paper-based systems shall: Protect the secrecy of the vote throughout the process. (V1: 2.4.3.2.1)
- Spanish language

Functional Test Cases

Using an all fill ballot definition (all right and left ballot positions utilized) vote the first and last ballot position in all contests on the 11x36 ballot (6 contest w/ 35 candidates). Scan the ballot on the scanners (M100, DS200, M650)
Using an all fill ballot definition (all right and left ballot positions utilized) vote the first and last ballot position in all contests on the 14x36 ballot (6 contest w/ 35 candidates). Scan the ballot on the scanners (M100, DS200, M650)
Using an all fill ballot definition (all right and left ballot positions utilized) vote the first and last ballot position in all contests on the 14x48 ballot (6 contest w/ 47 candidates). Scan the ballot on the scanners (M100, DS200, M650)
Using an all fill ballot definition (all right and left ballot positions utilized) vote the first and last ballot position in all contests on the 17x45 ballot (6 contest w/ 44 candidates). Scan the ballot on the scanners (M100, DS200, M650)
Using an all fill ballot definition (all right and left ballot positions utilized) vote the first and last ballot position in all contests on the 17x60 ballot (6 contest w/ 59 candidates). Scan the ballot on the scanners (M100, DS200, M650)
Using an all fill ballot definition (all right and left ballot positions utilized) vote the first and last ballot position in all contests on the 19x51 ballot (6 contest w/ 50 candidates). Scan the ballot on the scanners (M100, DS200, M650)
Using an all fill ballot definition (all right and left ballot positions utilized) vote the first and last ballot position in all contests on the 19/68 ballot (6 contest w/ 67 candidates). Scan the ballot on the scanners (M100, DS200, M650)
Create PCMCIA M100 card for early voting containing 494 precincts on one card. Vote, Close Polls and read into the ERM.
Create USB DS200 card for early voting containing 494 precincts on one card. Vote, Close Polls and read into the ERM.
Using DS200 firmware, create USB (DS200) for early voting containing 494 precincts on one card.
iVotronic L&A Vote Selected Ballot Test
iVotronic L&A Multi-Vote Test

iVotronic L&A Vote for one Test
In ERM load election database "02PNELAN" containing more than 1000 candidates in a single precinct.
Using ES&S test case "40,000 coded ballots (provisional) test case" and election database process 40,000 coded ballots in one precinct through the Election Reporting Manager (ERM). The ERM will handle the 40,000 coded ballots without error(s).

Table 6 - Matrix of Other System Testing

System Tests	Test Methodology
Volume Test	
Accuracy Test Case	System's response to processing more than the expected number of ballots/voters per precinct, to processing more than the expected number of precincts, or to any other similar conditions that tend to overload the system's capacity to process, store, and report data. Not required on this certification.
Stress Tests	
Hardware test Plan	Hardware test labs test the limits outside the range of 'normal' but within specifications for the units as defined in the VSS standards Vol.1: Section 3. System's responses to transient overload conditions. Subject polling place devices to ballot processing at the high volume rates, evaluate software response to hardware-generated interrupts and wait states.
Usability Tests	
GEN01 Test Case	Responses to input, text syntax, error message content, and audit message input.
Accessibility Test	
Accessibility	Test voting system capabilities to assist voters with disabilities, specifically as defined in Volume I, Section 2.2.7. Voting machines intended for use by voters with disabilities operate consistent with vendor specifications and documentation, and Voting machines intended for use by voters with disabilities meet all other functional requirements defined in Volume I, Section 2.
Security/Telecom Test	
Security Test Case	Incorporate systems security provisions, unauthorized access, deletion or modification of data, audit trail data, and modification or elimination of security mechanisms See attachment F for more details.
Recovery Tests	
Hardware Test Plan	Exercise system's ability to recover from hardware and data errors. Validate battery backup and recovery from error conditions, incorporated into Hardware test lab tests to requirements as defined in VSS Vol. 1: Section 3. (See also Hardware Tests)

4.3 Test Case Design

4.3.1 Hardware Qualitative Examination Design

SysTest Labs reviews the overall system capabilities, pre-voting, voting, and post-voting functions. The vendor's hardware subject to this Certification Test Plan is incorporated into the standard set of system level test cases with the augmentation of functionality-specific validation steps.

4.3.2 Hardware Environmental Test Case Design

Hardware environmental certification testing is performed to verify conformance to Vol 1. Sec. 3 of the FEC VSS April 2002. Hardware testing is performed in conformance with Vol. 1 Sec. 3 Hardware Standards and Vol. 2 Sec. 4 Hardware Testing of the April 2002 FEC VSS. See Attachment D for further information on the hardware testing.

4.3.3 Software Module Test Case Design and Data

SysTest Labs reviews the test case design documents and data as provided by vendor. In evaluating each module, with respect to flow control parameters and data on both entry and exit, SysTest Labs assesses the logical correctness, the adequacy of the code's modularity and construction, the implementation of the algorithms in assembly language (if used), the absence of hidden code, and the extent to which "industry standard" characteristics are incorporated.

4.3.4 Software Functional Test Case Design

SysTest Labs has reviewed the ES&S test cases against the 2002 VSS requirements matrix, in conducting the FCA Document Review, and has evaluated the test cases in light of the vendor's system functionality documents. SysTest Labs has prepared Functional Test cases using the operator/user procedures, and the data content of output reports. SysTest Labs will design and conduct all appropriate functional tests found necessary.

4.3.5 System-level Test Case Design

SysTest Labs has reviewed the ES&S test cases against the 2002 VSS requirements matrix, in conducting the FCA Document Review, and has evaluated the test cases in light of the vendor's system functionality documents. SysTest Labs created the system-level test cases using the operator/user procedures, maintenance and configuration management documents. SysTest Labs will conduct all System Level tests found necessary, in addition to the standard set of sample test cases and functional test cases run against voting systems for Certification testing.

4.3.6 Sampling Methodology

SysTest Labs has reviewed the ES&S test cases against the 2002 VSS requirements matrix, in conducting the FCA Document Review, and has evaluated the test cases in light of the vendor's system functionality documents. SysTest Labs selected a set from among the test cases reviewed to be run during the certification event.

Test Cases that will be sampled:

- AM - 3.0 View Log
- ERM - Process 100 Cards/200 Memory Sticks
- DS200 - 3.2 Opening Polls Functions: Open Polls with more than one Precinct

4.4 EAC Interpretations

The test engagement described in this Certification Test Plan utilizes only standard VSTL test methods that conform to the EAC Testing and Certification Program Manual and the appropriate voting system

standard. Additional EAC interpretations affect the test plan and test methodology and if used are noted below.

The Certification Test Plan and the execution of tests for the ES&S Unity 4.0 Voting System identified in this plan do not include any EAC interpretations.

5 TEST DATA

5.1 Data Recording

The FEC VSS, Vol. 2, Test Standards, measure certification-testing progress against the standards defined for all systems. SysTest Labs creates forms for the source code, TDP, and testing reviews. They will be stored in electronic format at SysTest Labs for the life of the voting system as defined by the vendor plus an additional seven years. SysTest Labs will record all activity via status report emails to the voting system vendor.

The testing process involves the assessment of:

- Operational accuracy in the recording and processing of voting data, as measured by the error rate articulated in Volume I, Section 3.
- Operational failure or the number of unrecoverable failures under conditions simulating the intended storage, operation, transportation, and maintenance environments for voting systems, using an actual time-based period of processing test ballots.
- System performance and function under normal and abnormal conditions; completeness and accuracy of the system documentation and configuration management records to enable purchasing jurisdictions to effectively install, test, and operate the system.

5.2 Test Data Criteria

SysTest Labs evaluates test results against the documents and software provided by the vendor. These documents shall be used to customize a standard set of system level tests. Testing will be conducted as an independent verification and validation across the entire voting system. A greater depth of testing will be given to places where there are code changes and changes to documentation. In the standard system level tests, elections are customized to the functionality supported by the voting system as identified by the vendor. System performance shall be measured against a predicted result.

5.3 Test Data Reduction

SysTest Labs processes the test data by manually recording data in the Test Case records and SysTest Labs templates.

6 TEST PROCEDURE AND CONDITIONS

6.1 Facility Requirements

Testing is performed either at the vendor's facilities per testing standards or at SysTest Labs facilities in Denver, Colorado. VSTL testing at a client site must meet the conditions under which testing is performed at SysTest Labs' laboratory.

The testing of the ES&S Unity 4.0 Voting System is to be executed at the vendor's facilities in Omaha, NE, in a secured room. A waiver requesting testing to continue testing in Omaha was submitted to the EAC and is pending

All TDP and test documentation is stored on site at SysTest Labs, Denver, CO, in the project directory on the Voting server.

SysTest Labs performs VSTL functional and system level testing at SysTest Labs' facility unless testing at the client site is necessitated by logistics related to the characteristics of one or more components of the voting system under test. Environmental hardware testing for voting systems may only be executed at the environmental hardware testing subcontractor's facility or their alliance lab facilities.

Prior to any VSTL test activities that occur at a client's site, both equipment and facility will be examined and analyzed to ensure that competent and up-to-date temporary facility support exists for testing of voting system technologies, in compliance with SysTest Labs' VSTL test standards and accepted practices of test engineering. If the equipment or facility is found not to be in compliance, SysTest Labs will identify, to the client, any necessary improvements in the equipment and/or facility. SysTest Labs assures that these improvements are made before client-site testing can begin.

When testing is performed at a Vendor facility, SysTest Labs requires that our test staff follow all protocols associated with recording, reporting, maintaining and controlling all test results. In addition, to ensure the integrity of all tests and recorded results, SysTest Labs requires that all test results be stored only on computer equipment provided and controlled by SysTest Labs, e.g., test staff laptop computers. SysTest Labs will control access to the test equipment, including hardware, software and firmware and the test room.

SysTest Labs always ensures voting rooms doors are kept locked at all times, unless the current activity requires that the door be opened. Vendor personnel are never left unattended in a voting room at any time.

6.2 Test Setup

The ES&S Voting System test platform will be set up, as part of the Physical Configuration Audit, in the standard configuration identified in the vendor TDP documents listed in **Attachment A TDP Documents**. The software will be installed, versions verified, and made operational. The hardware will also be set up and versions verified according to the vendor TDP documents. Once the hardware and software have been set up, SysTest Labs will proceed with testing the system.

6.3 Test Sequence

While there is no required sequence for performing voting system certification testing and audits, predecessor tasks are required for some testing. Tasks and any applicable predecessor tasks are identified in Table 5 - Matrix of System Functional Testing.

6.4 Test Operations Procedures

The SysTest Labs VSTL Test Team provides step-by-step procedures for each test case to be conducted. Each step is assigned a test step number and this number, along with critical test data and test procedures information, tabulated onto a test report form for test control and the recording of test results.

An inventory is performed to verify the voting equipment received contains hardware and software elements as defined in the TDP. Prior to commencement of Functional System testing, the PCA includes verification that the system can be configured using the system operations manuals.

Throughout the testing effort, test procedures are marked with the test result of **Accept** or **Reject**. If a failure of a test procedure precludes attempting subsequent test procedures, the test procedures that cannot be executed will be marked as **NT**, Not Testable. **NS** (not supported) indicates requirements that apply to features that are not supported in the configuration being tested. For expected functionality that is not implemented, the test procedure will be marked as **NT**, Not Testable. If a test procedure is not applicable to the current certification test effort it will be marked as **NA**, Not Applicable. **NA** would also be entered for any subsequent step that is not applicable. Test results Reject, NT, and NA will include comments by the tester explaining the reason for the result.

Issues encountered during review and testing are documented on the Discrepancy Report. Any non-conformities to the requirements of the applicable standards as identified in section 1.2 are marked as **Documentation Discrepancies** or **Functional Discrepancies** (a discrepancy occurs when the voting system component does not meet defined requirements or specifications). The vendor must address all discrepancies prior to issuance of the Certification Report. Issues that are encountered during testing, but are not addressed by the applicable standard will be added to the Discrepancy report and noted as **Informational**. The vendor has the option to address Informational issues. All responses provided by the vendor are noted in the Discrepancy Report appendix to the Certification Report.

7 Approval Signatures

SysTest Labs:

James M Nilius
Vice President, Compliance Services
October 10, 2007

Client:

Sue McKay
Director of Certification
October, 10 2007

End of Certification Test Plan
